REMARKS

Present Status of the Application

The Office Action dated April 6, 2005, rejected claims 1-21 under35 USC§103(a) as being unpatentable over Tungare et al. (US 6,594,414) in view of Kato et al. (US 6,326,216).

Applicant has most respectfully considered the remarks set forth in this Office Action. Regarding the obvious rejections, it is however strongly believed that the cited references are deficient to adequately teach the claimed features as recited in the presently pending claims. The reasons that motivate the above position of the Applicant are discussed in detail hereafter, upon which reconsideration of the claims is most earnestly solicited. After entering the amendments, a notice of allowance is respectfully solicited.

Discussion of the claim rejection under 35 USC 103

The Office Action rejected claims 1-21 under 35 USC 103(a) as being unpatentable over Tungare et al. (US-6,594,414, hereinafter Tungare) in view of Kato et al. (US-6,326,216, hereinafter Kato).

To establish a prima facie case of obviousness under 35 U.S.C.§ 103(a), the reference or references, taken alone or combined, must teach or suggest each and every element recited in the claims. Further, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. See M.P.E.P. § 2143,

8th., February 2003. Applicants submit that independent claims 1 and 12 patently define over the prior references for at least the reason that the cited art, either alone or in combination, fails to disclose or suggest each and every feature as claimed in the present invention.

Claims 1 and 12 teach, among other things, "*...forming a lanthanum nickel oxide (LNO) thin film as a bottom electrode for the capacitor by an in-situ method such that the lanthanum nickel oxide (LNO) thin film is epitaxially grown with a lattice structure; and forming the PZT thin film on the LNO thin film by an in-situ method such that the PZT thin film is epitaxially grown with a lattice structure the same as the LNO thin film at a temperature of about 350 to about 500 degrees Celsius...*". In brief, claims 1 and 12 of the present invention teaches an in-situ formation of a lanthanum nickel oxide thin film, wherein the desired lattice structure is same as those of the PZT thin film. Moreover, a PZT thin film is epitaxially grown on the LNO thin film, wherein the desired lattice structure of the PZT thin film is concurrently formed. Accordingly, unlike the conventional practice in which the PZT film must undergo a high temperature annealing process to obtain the desired structure after the forming of the thin film, the PZT thin film with the desired structure of the instant case is formed during the growing of the PZT film.

Alleged by the Office Action, Tungare teaches forming a PZT film over an electrode layer 513, which includes conductive monocrystalline oxides such as strontium, ruthenium, strontium vanadate, LaSrCoO3 and LNO. As acknowledged by the Office Action, the PZT film is formed by a sol-gel deposition technique (col. 24. ln. 45-46) rather than an in-situ sputtering. As known by one skilled in the art, a sol-gel deposition requires the deposition of a

sol solution which produces the coatings on the substrates by spraying, dipping or spinning, and the particles in sol are polymerized to produce a gel network. A final heat treatment is then conducted to pyrolyze the remaining organic or inorganic components to form the amorphous or crystalline coating. However, the crystalline structure of the PZT film of the instant case is formed during the growing of the PZT film. In other words, the formation of the crystalline structure of the PZT film does not require a heat treatment process after the growing of the film and the proper structure of the film materializes during the growing of the film. There is no teaching or mentioning that the PZT film is grown with a desired structure, a lattice structure the same as the LNO thin film, at a lower temperature.

However, relied upon Kato to disclose the sputtering method for forming the PZT film and annealing at a temperature of 400-700 °C, the Office concludes that it would have been obvious to one skilled in the art at the time of the present invention to modify the disclosure of Tungare with Kato's sputtering method because PZT was known by Kato to be deposited by sputtering and that motivation is given in Kato in that PZT obtained contributed to the production of yields of the device into which it was integrated. Applicants again disagree with the Office's assertion.

Similar to Tungare, Kato also teaches a subsequent anneal process at an elevated temperature to grow fine clusters into crystal grains after the PZT film 24 is formed. The PZT 24 of Kato is first formed at room temperature, followed by the anneal process conducted between 500 to 800 degrees Celsius (col. 10, ln. 57-63 &, col. 12, ln. 31-33). In other words,

Kato also fails to teach forming the PZT thin film on the LNO thin film by an in-situ method such that the PZT thin film is epitaxially grown with the desired lattice structure at a temperature of about 350 to 500 degrees Celsius. It is critical to form both the lanthanum nickel oxide film and growing the PZT thin film by an in-situ method as taught in claims 1 and 12 of the present invention to provide the desirable electrical property for the ferroelectric memory. Further, Kato fails to teach or suggest a LNO thin film with a lattice structure the same as that of the subsequently grown PZT thin film. Accordingly, both Tungare and Kato, either alone or in combination, fail to teach each and every feature of the proposed independent claims 1 and 12.

Since claims 1-21 patently define over Tungare and Kato, and should be allowed. Claims 2-11 and 13-21, which depend from Claims 1 and 12, directly or indirectly, are also patentable over Tungare and Kato, at least because of their dependency from an allowable base claim. Reconsideration and withdrawal of the above rejections is respectfully requested.

CONCLUSION

For at least the foregoing reasons, it is believed that all the pending claims 1-21 of the present application patently define over the prior art and are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
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